RICARDO (JOEY) GUINTO, BSN, RN, VA-BC, CRNI

The Vascular Access Team: Diane Davis, RN, BSN, VA-BC; Chynna Vu, RN, VA-BC; Sabela Barrios, RN, VA-BC; Summer Cortinas, RN, BSN, VA-BC; Lynda Fenton, RN, VA-BC; Jeremy Tan, RN, BSN; Vinh Le, RN, VA-BC

MAGNET RECOGNIZED — AMERICAN NURSES CREDENTIALING CENTER

St. Joseph Health — St. Joseph Hospital

The Effectiveness of Electrocardiogram Tip Confirmation System As Compared to Chest Radiography in Peripherally Inserted Central Catheter (PICC) Placements.

BACKGROUND

- The goal in inserting a central venous catheter (CVC) is to have the catheter tip in optimal location thus avoiding catheter-related complications.
- The most appropriate PICC tip location is the lower one third of the SVC close to the junction of the SVC and the right atrium, also known as **Cavo-Atrial Junction** (CAJ).
- At SJO, most patients (~72%) with PICC inserted by the Vascular Access Team (VAT) are confirmed by ECG tip confirmation method. The only exception is critical care where the Intensivists order chest X-ray (CXR).

PURPOSE

- Evaluate the success rate and malposition rate of PICC placement using the ECG tip confirmation system.
- Reduce the cost of care by eliminating radiographic confirmation and decreases patient exposure to radiation.
- The goal of this project was to adopt ECG technique for eligible patients as the preferred method for PICC tip confirmation at SJO.

METHODS

- **Sample**: 350 adult patients (>18 yrs.) in critical care with successful PICC placement by VAT from January 2017 to December 2019 were enrolled.
- **Eligibility**: Normal surface ECG with P wave present, identifiable and consistent.
- **Retrospective chart review** of 350 PICC placements in critical care by VAT nurses. ECG confirmation record and post-insertion CXR report reviewed and compared for accurate tip placement.

RESULTS

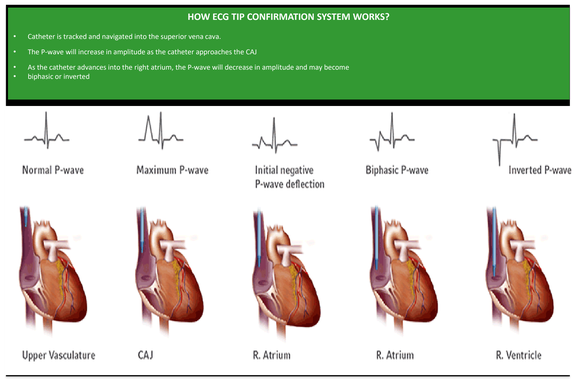
- ECG tip confirmation method had a tip positioning accuracy of **92.86%** (325/350) success rate as verified by CXR report.
- Of the 350 PICCs positioned with ECG technique, malposition of the PICC was observed in 25 cases **(7.14%),** 3% in sub-optimal and 4% in aberrant position.

Accuracy and Malposition Rate of ECG confirmation

Confirmed by 3CG and CXR	Upper SVC or higher	Mid-SVC	Distal SVC/CAJ (optimal	Right Atrium	Total
2019	0	1	85	7	93
2018	0	4	122	2	128
2017	0	5	118	6	129
Total	0	10	325	15	350

Comparison of Cost & Time to use Between Methods

	Confirmed by ECG	Confirmed by CXR
Estimated cost of placement verification	$0	$400.00 (does not include radiologist fee)
Released for use of PICC	Upon completion of insertion	49 minutes (time to stat report)

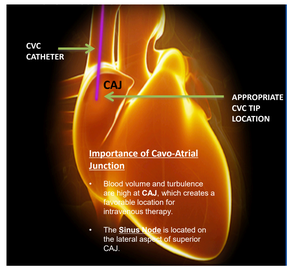


LIMITATIONS

- Assessment of catheter tip position on CXR is subject to observer variability and leads to treatment delay.

DISCUSSION

- This project demonstrated that ECG tip confirmation offers a high success rate and low malposition rate leading to more successful PICC placements.
- ECG method reduces cost of care because unnecessary confirmatory X-ray is eliminated.
- ECG tip confirmation allows the PICC to be used immediately as compared to waiting time for CXR (~ 49 minutes).
- It reduces treatment delays and delays caused by repositioning.
- Shared data with management and intensivists. Small changes in progress.
- ECG method is a safe, accurate, and inexpensive method for verifying PICC tip location at the bedside. It allows for real-time placement verification and eliminates the need for CXR.



REFERENCES

References available upon request:
Ricardo.Guinto@stjoe.org